



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D. C. 20555

MAY 5 1986

Docket No.: 50-440

MEMORANDUM FOR: B. D. Liaw, Chief
Engineering Branch
Division of BWR Licensing

FROM: Phyllis Sobel, Geophysicist
Engineering Branch
Division of BWR Licensing

SUBJECT: MEETINGS WITH USGS AND CEI TO DISCUSS PROGRESS
ON GEOLOGY/SEISMOLOGY CONFIRMATORY ISSUES FOR
PERRY PLANT

In the morning of April 18, 1986, the U.S. Geological Survey (USGS) reported their progress on studies related to the January 31, 1986 earthquake near the Perry plant. An attendance list for that meeting is attached.

Charles Langer of the USGS summarized historical seismicity in Ohio. He has located the aftershocks of the January 31 earthquake and found no definitive fault plane suggested by the data. The aftershocks occurred at 5 to 6 km depth.

Craig Nicholson calculated fault plane solutions for the aftershocks from USGS data and all other available data. The fault plane solutions of the two largest aftershocks are mostly strike slip with an ENE P-axis. Not all the aftershocks show the same focal mechanism; some show mostly oblique slip.

Roger Borchardt found some indication of lineation in aftershock locations based on USGS data using GEOS instruments. The GEOS instruments are able to record ground motion at higher frequencies than other systems. Energy from the aftershocks was recorded out to at least 70 to 80 hz. He found for station 1, which is next to the Perry plant site, there were anomalously high amplitudes recorded for the aftershocks, especially energy at 5 to 10 hz and 20 hz. He suggested the till layer underlying the instrument has 20 hz resonance. The Perry plant, where 4 and 20 hz energy was recorded for the main shock, is founded on rock. The difference in site conditions between the Perry plant and station 1 will be investigated further by Borchardt.

Rob Wesson reviewed the possibility of induced seismicity in northeastern Ohio. One model of stress as a function of distance for the deep waste injection wells suggests an increase in stress of a few bars at a distance of 12 km and a depth of 2 km after 15 years of injection. A few bars of pressure change predicted near the recent earthquake suggests the wells are not a major factor in triggering the earthquake.

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MAY 5 1986

B.D. Liaw

- 2 -

Wesson has also considered solution mining for salt as a source of seismicity. Solution mining began near Cleveland in 1889 and there were earthquakes that may be associated with solution mining in 1906 and 1932 (both maximum intensity V), but the association is not clear.

In the afternoon of April 18, the USGS presented a summary of their work to CEI, the Perry utility. Borchardt suggested a site investigation at some of the USGS stations would help assess if the 20 hz energy observed at station 1 is a site effect. Dick Holt of Weston Geophysical, a CEI consultant, suggested that the 20 hz energy observed at station 1 could be due to resonance in the till layer. CEI will provide a velocity profile for station 1 to the USGS.

15/
Phyllis Sobel, Geophysicist
Engineering Branch
Division of BWR Licensing

Attachment: Attendance

cc w/attachment:

- R. Bernero
- G. Lainas
- W. Butler
- F. Congel
- L. Beratan
- A. Murphy
- R. LaGrange
- R. Hermann
- N. Anderson
- P. Sobel
- J. Stefano
- S. Stern
- R. Savio
- L. Reiter
- I. Alterman
- A. Lee
- G. Geise-Koch
- R. Rothman
- R. McMullen

OFC	: BWEB	: BWEB	:	:	:	:
NAME	: PSobel:cdd	: B.D.Liaw	:	:	:	:
DATE	: 4/5/86	: 4/ /86	:	:	:	:

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NRC/USGS MEETING

APRIL 18, 1986

NRC

J. Stefano
L. Reiter
P. Sobel
I. Alterman
A. Murphy
R. Savio
R. McMullen

USGS

R. Wesson
C. Nicholson
C. Langer
R. Borchardt

NIRS

L. Bloom